TITLE OF THE INVENTION

~~COMPUTER SYSTEM HAVING CONFLICT FIXING FUNCTION AND CONFLICT FIXING METHOD~~

CLAIM OF PRIORITY

This application makes reference to, incorporates the same herein, and claims all benefits accruing under 35 U.S.C. §119 from applications entitled *CD-ROM And Method For Recovering Computer System Having Conflicts, Computer System Processing the Function of Recovering from the Conflicts And Method Thereof* and *Computer And Method For Recovering Itself to a State Prior to Conflict* previously filed in the Korean Industrial Property Office on the 26th day of December 1997 and duly assigned Application Nos. 97-074450, 97-074451 and 97-074453 and an application entitled *Computer and Method for Recovering Itself to the State Prior to Conflict* previously filed in the Korean Industrial Property Office on the 16th day of June 1998 and duly assigned Application No. 98-022575.

Field of the Invention

The present invention relates to a computer system, and more particularly, to a computer system which gives an automatic fixing function when a conflict occurs, and an automatic conflict fixing method.

Description of the Related Art

U.S. Patent No 5,159,597 to Monahan et al describes a *Generic Error Recovery* method and apparatus. The error recovery subsystem employs a user editable file including the rules for defining the system state, the error states, and the sequences of recovery actions to be taken depending upon the comparison between the system state and the error states. Actions that constitute error recovery comprise restarting a software process, reinitializing a data area, rebooting a central processing unit, and resetting a piece of hardware. What is needed is a computer system that first tries to repair the conflict. If this fails, the system then tries to revert or reset the computer system to a normal state that occurred prior to the conflict.

SUMMARY OF THE INVENTION

To solve the above problem, it is an object of the present invention to provide a computer system having a conflict repair function, which allows a user to cure the conflict or revert the computer system to a previous state.

It is another object of the present invention to provide a method of reverting a computer system to a previous normal state when a conflict is sensed from the computer system.

It is still another objects of the present invention to provide a recording medium for easily fixing a conflict occurring on an auxiliary memory unit of a computer system, and a method thereof.

Accordingly, to achieve the first object, there is provided a computer system having a conflict repair function and including a control unit, a main memory, an auxiliary memory, and an input output device, wherein the control unit comprises: a state information recording portion for

collecting state information on the computer system and recording the collected information in the auxiliary memory; a conflict sensing portion for sensing a general protection fault, a system registry fault, and a system hardware information abnormality when the computer system is operated, and reporting the sensed faults to a user via the input output device; a state diagnosis portion for diagnosing the presence or absence of abnormality in the computer system according to a user's instruction, attempting to fix an abnormality using diagnosed contents when the abnormality is sensed, and reporting to the user via the input output device abnormality incapable of being fixed by the diagnosed contents; and an existing state reverting portion for reverting the computer system to a state when state information selected by the user among state information recorded in the state information database was produced.

To achieve the second object, there is provided a method of reverting a computer system to its previous state, comprising the steps of: (a) collecting and backing up state information of the computer system; (b) sensing a conflict of the computer system and reporting the sensed conflict to a user; and © reverting the computer system to a state when state information selected by the user from back-up state information was produced.

To achieve the third object, there is provided a recording medium for fixing a conflict of a computer system, comprising: a boot image loaded in a main memory installed in the computer system when the computer system is booted, for managing the operation of the computer system; a program image consisting of an operating system and application programs to be installed in an auxiliary memory unit of the computer system, and a list of the operating system and application programs; and a conflict repair control program having a code means (a) loaded in the main memory

of the computer system for checking whether the auxiliary memory unit is normal, and a code means (b) for repairing damaged files in the auxiliary memory unit using the program image when abnormality exists in the auxiliary memory unit.

To achieve the fourth object, there is provided a method of fixing a conflict generated on an auxiliary memory in a computer system using a CD-ROM device including a CD-ROM, comprising the steps of: (a) setting the CD-ROM device as a master device, booting the computer system, checking a conflict of the auxiliary memory, and repairing a damaged system file; (b) reinstalling an operating system in the auxiliary memory, comprising the substeps of: (b.1) setting the CD-ROM device as a master device and booting the computer system again when a new booting when the auxiliary memory is set as the master device fails; (b.2) backing up data files stored in the auxiliary memory and formatting the auxiliary memory; (b.3) installing an operating system among a program image recorded in the CD-ROM, in the auxiliary memory; and (b.4) setting the auxiliary memory as a master device and newly booting the computer system; © reinstalling application programs in the auxiliary memory using the program image recorded in the CD-ROM; and (d) restoring the data file backed up in step (b.2) in the auxiliary memory.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete appreciation of the invention, and many of the attendant advantages thereof, will be readily apparent as the same becomes better understood by reference to the following detailed description when considered in conjunction with the accompanying drawings in which like reference symbols indicate the same or similar components, wherein:

FIG. 1 is a flowchart illustrating an earlier process for repairing a conflict of an earlier computer system;

FIG. 2 illustrates a process where a conflict is repaired by a repair service man;

FIG. 3 is an exterior view of a desk top personal computer;

FIG. 4 is an exterior view of a notebook PC;

FIG. 5 is a block diagram of the configuration of a computer system having a conflict repair function, according to the present invention;

FIG. 6 shows the contents recorded in a recording medium for fixing a conflict of a computer system according to the present invention;

FIG. 7 is a flowchart illustrating a process for reverting a computer system to its previous normal state, according to the present invention;

FIG. 8 shows an example of a user interface which displays to a user a list of state information stored in a state information database; and

FIG. 9 is a flowchart illustrating a process for fixing a conflict generated on an auxiliary memory unit of a computer system using a CD-ROM, according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

According to earlier computers, as shown in FIG. 1, an operating system (e.g., Windows 95®) of a computer system senses a conflict occurring while the computer system operates (in steps 100 and 110). The operating system generates an error message when the conflict occurs on a device and generates a general protection fault (GPF) or terminates the program without solving the conflict

when the conflict occurs during operation of a program (in steps 120 and 130). In this situation, if a user does not repair the generated conflict appropriately, the conflict develops into a fatal error of the entire computer system, and, in a bad case, a hard disk may have to be reformatted or replaced. Meanwhile, when a user has no idea how to fix a conflict generated on a computer system, the user request a repair service to a service center as shown in FIG. 2. Then, the service center receives the request and sends a repair service man to the user, and the repair man directly checks and repairs the computer system of the user.

However, in the earlier method, even though a very small conflict is generated on the computer system, the repair service man must personally visit a place where the computer system is located. Also, when a conflict occurs frequently on the computer system, it is difficult to get a repair service at a proper time. Thus, the user requires considerably a lot of time and costs to repair the conflict occurring on the computer system.

A computer system having a conflict repair function according to the present invention, is a personal computer (PC) such as a desk top PC shown in FIG. 3 or a notebook PC shown in FIG. 4, and has a configuration as shown in FIG. 5. Hereinafter, an operating system for the computer system according to the present invention is considered as a Windows ®.

~~Referring to FIG. 5, a computer system having a conflict repair function according to the~~ present invention includes a conflict repair control unit 500, a main memory 510, an input output unit 520, an auxiliary memory unit 530, and a conflict repair CD-ROM 540. The conflict repair control unit 500 is comprised of a state information recording portion 502, a conflict sensing portion ~~504, a state diagnosing portion 506, and an existing state reverting portion 508.~~

The state information recording portion 502 stores the state information of a computer system in the auxiliary memory unit 530 before the computer system terminates or at the point of time determined by a user. The state information includes system information such as a registry of Window95® and state data of device drivers. The state information recording unit 500 forms a state information database 532 in the auxiliary memory unit 530 with the state information. The state information database 532 includes as many state information blocks as determined by the user, and each of the state information blocks contains state information generated by the state information recording portion 502. State information stored for the longest time is updated by new state information. The state information database 532 in the auxiliary memory unit 530 can further include state information of the computer system when it is forwarded, and state information of the computer system immediately before an application program is installed in it.

The conflict sensing portion 504 monitors the computer system periodically and senses generation of a conflict. That is, the conflict sensing portion 504 senses a general protection fault (GPF), a system registry fault, and abnormality of system hardware information, from the computer system. For example, a process handler constituting a kernel of an operating system senses the GPF generated when a program is executed in a virtual memory space.

The state diagnosing portion 506 diagnoses the entire state of the computer system at the time determined by a user, and reports the presence or absence of abnormality to the user. The computer system can include a state diagnostic button to be used when the user recognizes that state diagnosis is necessary. Accordingly, if the user presses down on the state diagnosis button, the state diagnosing portion 506 is immediately driven. The diagnosed content obtained by the state

diagnosing portion 506 includes version numbers and information on the operation state of each device, an operating system and application programs installed in the computer system.

~~The diagnosed contents of the computer system processed the state diagnosing portion 506~~ will now be described in detail. As for the device, the type of a processor is checked, the capacity of the main memory 510 is found out by checking the state of the main memory 510, the type, resolution, and color of a video card are checked, a check of whether an MPEC card will be recognized is made by executing an MPEC file, an execution state of a modem command is tested, the operations of each of a floppy disk device, a CD-ROM device, and a digital video disk (DVD) device are tested, and serial/parallel ports are checked. As for the operating system, a check of whether system files in a system directory are damaged is made, and a configuration file and registration information are also checked on whether they are damaged. The state diagnosing portion 506 repairs an abnormality by estimating the cause of generation of the abnormality on the basis of the above diagnosed contents. Also, when a conflict incapable of being repaired by current diagnosis contents occurs, the state diagnosing portion 506 produces a message for reporting the fact to the ~~user~~.

The existing state reverting portion 508 reverts the computer system to its previous normal state using a state information block selected by the user among state information blocks included in the state information database 532 of the auxiliary memory unit 530. The auxiliary memory unit 530, such as a hard disk driver, a floppy disk driver, and a tape driver, stores programs and data files which are to be loaded in the main memory 510 and then executed.

The conflict repair CD-ROM 540 is used when a conflict, unable to be fixed even by existing

backed-up state information and diagnosis information, is generated in the computer system having a conflict repair function according to the present invention or when the user intends to newly install the operating system and application programs of the computer system.

Referring to FIG. 6, the conflict repair CD-ROM records a boot image 600 for booting the computer system form a CD-ROM driver, a program image 610 of an operating system and application programs to be installed, and a CD-ROM repair control program 620. The boot image 600 is an image of system files included in an operating system for managing the operation of a computer system by being loaded in the main memory 510 of the computer system when the computer system sets a CD-ROM driver as a master device to be booted. The program image 610 is a back-up image of an operating system and application systems which are basically installed in the auxiliary memory unit 530 in the computer system. The program image 610 is compressed and backed up. The program image 610 includes a list of the title, size, directory, and attribute of each file to allow the user to select files to be installed in the auxiliary memory unit 530.

The CD-ROM repair control program 620 includes an inspection code means 630 and a repair code means 640. The inspection code means 630 is loaded in the main memory 510 provided in the computer system and inspects whether the auxiliary memory unit 530 is abnormal. The repair code means 640 repairs damaged files in the auxiliary memory unit 530 using the program image 610 stored in the conflict repair CD-ROM 540. Also, the repair code means 640 includes a total installation portion 642 for newly installing all the programs included in the program image, and a selective installation unit 644 for selecting and installing only programs desired by a user. The user can select either the total installation unit 642 or the selective installation unit 644.

~~The operation of the present invention will now be described in detail. Referring to FIG. 7,~~ a process for reverting a computer system to its initial software installation state is as follows. First, when the computer system is normally booted, conflict repair control is executed in a background operation to periodically inspect the computer system, in steps 700 and 705. When the conflict repair control unit senses a GPF, a system registry error, or a system hardware information abnormality from the computer system, it generates a top most window and receives instructions from the user, in steps 710 and 735. When the user presses down on a state diagnostic button to check his or her computer system, the state of the computer system is diagnosed, and when a conflict is sensed, the conflict is immediately fixed using diagnosed contents, in steps 715 through 725. However, when the sensed conflict cannot be fixed by the diagnosed contents, the conflict repair control unit generates the top most window and receives an instruction from the user, in steps 730 ~~and 735~~.

At this time, the conflict repair control unit presents a list of state information stored in the state information database of the auxiliary memory unit to the user. FIG. 8 shows an example of a window for displaying a list of state information stored in the state information database to the user. When the user selects a state information item from the state information list so that the computer system reverts to its original state, the conflict repair control unit reads out the selected state information from the auxiliary memory unit so that the computer system reverts to a state before the state information was backed up, in steps 740 and 745. When the revert to a previous state is completed or the user does not want the revert to an original state, the conflict repair control unit reverts to the background operation and a hidden operation, in step 750.

When the computer system is terminated, the conflict repair control unit inspects the state information of the system, and the inspected system state information is stored in the state information database of the auxiliary memory unit, in step 755. Here, when previously allocated regions for the state information database of the auxiliary memory unit are all used, new state information is overwritten in a region storing the oldest state information. When the computer system is abnormally booted or the user determines that a serious conflict is generated on the computer system, conflict repair is tried using the conflict repair CD-ROM, in step 760. The conflict fixing process using the conflict repair CD-ROM will now be described referring to FIG. 9.

The CD-ROM device 130 is determined as a master device, the boot image of FIG. 6 is loaded in the main memory of the computer system, and thus the computer system is booted from a CD-ROM disk, in step 900. The user loads the CD-ROM repair control unit of the CD-ROM of FIG. 6 in the main memory of the computer system, and executes the CD-ROM repair control program to check the state of a hard disk device, in step 905. Here, a scandisk command provided by MS-DOS® can be used. The CD-ROM repair control program repairs a system file where abnormality is sensed by executing the scandisk to a content read from the program image of the CD-ROM, and boots the computer system again by determining the hard disk device as a master device, in step 910.

When any of the booting by the MS-DOS® and that by the Windows® is not properly accomplished, it is determined that a serious conflict occurs on a hard disk, and the CD-ROM device is set to be a master device and the computer system is thus booted from the CD-ROM disk, in steps 915, 920 and 940. Thereafter, the CD-ROM repair control program is again executed. At this time,

the CD-ROM repair control program compresses all the data files stored in the hard disk and backs up the compressed data files to another auxiliary memory unit of the computer system, in step 925. Here, the another auxiliary memory unit can be a floppy disk or other hard disks with no conflict. The CD-ROM repair control unit newly partitions and formats the hard disk using FDISK and FORMAT commands of MS-DOS®, in step 930. An operating system is again installed in the hard disk by reading system files from the program image of the conflict repair CD-ROM, in step 935. When both the booting by the MS-DOS® and that by the Windows® are properly accomplished, the CD-ROM repair control program is executed to analyze the state of programs installed in the hard disk, in steps 915, 940 and 945.

The CD-ROM repair control program deletes all abnormal programs, releases the compression of the images of application programs among program images shown in FIG. 6, and installs the compression-released programs in the hard disk again, in steps 950 and 955. The CD-ROM repair control program finishes recovery of the hard disk by reading the image of data files backed up in step 925 and again storing the read data files in the hard disk, in step 960. Meanwhile, an embodiment of the method of reverting the computer system to its previous state according to FIG. 7, and an embodiment of the method of fixing a conflict of the auxiliary memory unit of the computer system according to FIG. 9, each can be written in a program which can be executed in a computer. Also, these embodiments can be accomplished in a common-use digital computer which operates a program from a medium used in a computer. The medium includes a magnetic storage medium (e.g., a ROM, a floppy disk, a hard disk, etc.), an optical reading medium (e.g., a CD-ROM, a DVD, etc.), and a storage medium such as a carrier wave (e.g., transmission via Internet).

A functional program, code and code segments for accomplishing the present invention can be easily inferred by programmers skilled in the art to which the present invention pertains. According to the present invention, a conflict generated on a personal computer system can be easily fixed. When an unrepairable conflict occurs, the computer system with the conflict can easily revert to its previous state using existing state information. Also, when a serious conflict is generated on an auxiliary memory unit including a hard disk device, the conflict can be easily repaired by image files recorded in a CDROM.